

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace, without prejudice, all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS:

1. (Currently Amended) A method for controlling a camshaft control device in a start-up operation of an internal combustion engine, the camshaft control device being for steplessly changing valve timing in the internal combustion engine which has a crankshaft and at least one camshaft, a phase angle of the camshaft being changeable with respect to the crankshaft by the camshaft control device, the camshaft control device including a locking position, the method comprising:

determining, in the start-up operation of the internal combustion engine, whether there is an adaptation of the camshaft to the crankshaft so that the phase angle of the camshaft with respect to the crankshaft may be determined;

monitoring the phase angle during an operation of the internal combustion engine; and
controlling the camshaft control device as a function of a variable setpoint value so that the phase angle is equivalent to the setpoint value;

wherein, when there is no release command and the adaptation has not occurred and the camshaft control device is not in the locking position in the start-up operation of the internal combustion engine, the camshaft control device is activated so that the camshaft control device assumes a predefinable reference position that is different from the locking position, and wherein the reference position is selected in such a way that an idling operation of the internal combustion engine is enabled, and wherein the setpoint value is purposefully controlled in such a way that the camshaft control device lies outside the locking position to prevent an independent locking.

2. (Previously Presented) The method of claim 1, wherein the camshaft control device is operated in the locking position after a start of the internal combustion engine, until at least one of the following is satisfied: (i) a release takes place by an engine temperature leaving a predefinable temperature range; (ii) an adaptation requirement of the setpoint value of the phase angle is present; (iii) a predefinable time period is exceeded; and (iv) an independent release of at least one of the at least one camshaft is detected.

3. (Canceled).

4. (Previously Presented) The method of claim 1, wherein a possibility of an independent locking of the camshaft control device is detected if an ascertained phase angle is in a predefinable locking range that surrounds the locking position, and the setpoint value lies outside the locking range.

5. (Previously Presented) The method of claim 4, wherein in response to a detection of a possibility of an independent locking of the camshaft control device, during a predefinable time span checking as to whether an actual value of the phase angle of the camshaft control device is moved out of the locking range again and, during this time span, if the actual value of the phase angle does not remove itself from the locking region, the independent locking is detected.

6. (Original) The method of claim 1, further comprising:

initiating, as a function of an unlocking demand, an unlocking procedure for unlocking the camshaft control device; and

initiating a release procedure upon detecting an independent locking.

7. (Original) The method of claim 6, further comprising:

checking whether the release procedure has been successfully performed; and

repeating the release procedure if the release procedure was not successful.

8. (Currently Amended) A computer program that is executable on a control arrangement to control a camshaft control device in a start-up operation of an internal combustion engine, the camshaft control device being for steplessly changing valve timing in the internal combustion engine which has a crankshaft and at least one camshaft, a phase angle of the camshaft being changeable with respect to the crankshaft by the camshaft control device, the camshaft control device including a locking position, the controlling being done by performing the following:

determining, in the start-up operation of the internal combustion engine, whether there is an adaptation of the camshaft to the crankshaft so that the phase angle of the camshaft with respect to the crankshaft may be determined;

monitoring the phase angle during an operation of the internal combustion engine; and controlling the camshaft control device as a function of a variable setpoint value so that the phase angle is equivalent to the setpoint value;

wherein, when there is no release command and the adaptation has not occurred and the camshaft control device is not in the locking position in the start-up operation of the internal combustion engine, the camshaft control device is activated so that the camshaft control device assumes a predefinable reference position that is different from the locking position, and wherein the computer program is run on a microprocessor of the control arrangement, and wherein the setpoint value is purposefully controlled in such a way that the camshaft control device lies outside the locking position to prevent an independent locking.

9. (Original) The computer program of claim 8, wherein the computer program is stored at one of a memory element, a random-access memory (RAM), a read-only memory (ROM), and a flash memory.

10. (Currently Amended) A control unit for controlling a lockable, stepless camshaft control device in a start-up operation of an internal combustion engine, the camshaft control device being for steplessly changing valve timing in the internal combustion engine which has a crankshaft and at least one camshaft, a phase angle of the camshaft being changeable with respect to the crankshaft by the camshaft control device, the camshaft control device including a locking position, the method comprising:

a determining arrangement to determine, in the start-up operation of the internal combustion engine, whether there is an adaptation of the camshaft to the crankshaft so that the phase angle of the camshaft with respect to the crankshaft may be determined;

a monitoring arrangement to monitor the phase angle during an operation of the internal combustion engine; and

a controlling arrangement to control the camshaft control device as a function of a variable setpoint value so that the phase angle becomes equal to the setpoint value;

wherein, when there is no release command and the adaptation has not occurred and the camshaft control device is not in the locking position in the start-up operation of the internal combustion engine, the camshaft control device is activated so that the camshaft control device assumes a predefinable reference position that is different from the locking position, and wherein the setpoint value is purposefully controlled in such a way that the camshaft control device lies outside the locking position to prevent an independent locking.

11. (Previously Presented) The control unit of claim 10, further comprising:
an initiating arrangement to initiate a release procedure to release the camshaft control device as a function of at least one release demand;
a checking arrangement to check whether the release procedure was successfully performed; and
a repeating arrangement to repeat the release procedure in response to a detected, unsuccessful release procedure.

12. (Previously Presented) The method according to claim 1, wherein the locking position is selected such that the start-up operation of the internal combustion engine, optimized with respect to the exhaust gas, is performed as quickly as possible.